What is Claimed:

1. An apparatus for coupling N inputs to N outputs comprising:

a plurality of separate, substantially identical, static KxK interconnect networks wherein the plurality has a total of at least N^2 discrete signal carrying inputs and N^2 discrete signal carrying outputs with K<N, wherein $\frac{N}{K}$ networks are each coupled to K inputs.

2. An apparatus as in claim 1 which includes K, 1-to-N input switches coupled between K inputs and the $\frac{N}{K}$ networks.

3. An apparatus as in claim 2 which includes N output switches coupled between $\left(\frac{N}{K}\right)^2$ networks and N outputs.

4. An apparatus as in claim 1 wherein $\left(\frac{N}{K}\right)^2$ networks are coupled between the inputs and outputs.

5. An apparatus as in claim 2 wherein connectivity between the inputs, networks and outputs is symmetrical relative to a selected centerline.

6. An apparatus as in claim 5 wherein the networks comprise optical transmission paths.

7. An apparatus as in claim 6 wherein N optical input switches are coupled to the plurality of networks.

8. An apparatus as in claim 7 wherein N optical output switches are coupled to the plurality of networks.

9. An apparatus as in claim 1 wherein K different sources are coupled to K^2 network inputs and K different outputs are coupled to K^2 network outputs.

10. A modular cross-connect switch having N inputs independently connectable to N outputs, the switch comprising:

a plurality of substantially identical static interconnect modules wherein each module has K^2 inputs connected to K^2 outputs, wherein K<N; and

wherein the plurality comprises $\left(\frac{N}{K}\right)^2$ modules.

11. A switch as in claim 10 wherein the modules are each implemented with a second plurality of substantially identical static interconnect modules wherein each module of the second plurality has less than K inputs.

12. A switch as in claim 10 which includes a plurality of input switches coupled to the interconnect modules.

13. A switch as in claim 12 wherein the input switches comprise 1xN input switches.

14. A switch as in claim 13 wherein the input switches form $\frac{N}{K}$ groups.

15. A switch as in claim 14 wherein the plurality of interconnect modules forms $\frac{N}{K}$ groups.

16. A switch as in claim 10 wherein the interconnect modules each comprise one of a plurality of optical transmission paths and a plurality of electrical transmission paths.

17. A switch as in claim 16 which includes a first plurality of optical switches coupled to input sides of the modules.

18. A switch as in claim 17 which includes a second plurality of optical switches coupled to output sides of the modules.

19. A switch as in claim 18 wherein at least the first plurality includes N switches.

20. A method of implementing an NxN cross-connect switch comprising:

selecting a value for N;

selecting a value for K<N;

providing a plurality of identical KxK static cross-connect modules;

coupling N inputs to the plurality ; and

coupling N outputs from the plurality.

21. A method as in claim 20 wherein the providing step includes providing $\left(\frac{N}{K}\right)^2$ modules

22. A method as in claim 20 which includes coupling $\frac{N}{K}$ groups of input switches to the modules.

23. A method as in claim 20 which includes coupling K input switches to a group of modules from the plurality.

24. A method as in claim 23 which includes dividing the plurality of modules into $\frac{N}{K}$ groups.

25. A method as in claim 23 which includes coupling N output switches to the plurality.

26. A method as in claim 20 which includes coupling $\frac{N}{K}$ groups of input switches only to respective groups of cross-connect modules.

27. A method as in claim 26 which includes coupling a plurality of output switches between the members of different groups of modules.

28. A method as in claim 20 which includes replacing a defective module with a module substantially identical to other members of the plurality of modules.

29. A method as in claim 20 which includes providing K^2 optical transmission paths in each interconnect module.

30. A modular connecting network comprising:

M input ports;

M output ports;

a plurality of substantially identical static NxN interconnect blocks where N<M wherein the blocks are coupled between the input ports and the output ports, wherein each block includes a plurality of substantially identical KxK interconnect modules.

31. A network as in claim 30 wherein M is an integer multiple of N.

32. A network as in claim 30 wherein the interconnect modules each comprise K^2 separate transmission paths.

33. A network as in claim 32 wherein the transmission paths comprise one of static, optical fibers or static electrical conductors.

34. An apparatus formed of interconnect modules wherein for N^2 inputs and N^2 outputs the apparatus comprises:

$\left(\frac{N}{K}\right)^2$ substantially identical modular signal interconnect networks wherein each network includes K^2 inputs and K^2 outputs where each input is connected to one output and wherein signals are transferred between inputs and respective outputs by one of optical fibers or electrical conductors.

35. An apparatus as in claim 34 which includes a plurality of 1xN switches coupled to inputs to the modules.

36. An apparatus as in claim 34 which includes a plurality of Nx1 switches coupled to outputs to the modules.

37. An apparatus as in claim 35 which includes a control circuit coupled to each of the switches.

38. An apparatus as in claim 37 which includes a plurality of Nx1 switches coupled to outputs to the modules and to the control circuit.

39. An apparatus as in claim 35 wherein the plurality of 1xN switches comprises $\frac{N}{K}$ groups of switches.

40. An apparatus as in claim 36 wherein the plurality of Nx1 switches comprises $\frac{N}{K}$ groups of switches.

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~~41. A signal coupling network for coupling any one of N1 inputs to any one of N2 outputs comprising:~~

~~a plurality of substantially identical, static, KxK signal interconnect modules wherein each receives K^2 input signals, where K<N1, and couples them to K^2 outputs.~~

42. A network as in claim 41 wherein the plurality comprises $\left(\frac{N1}{K} x \frac{N2}{K}\right)$ modules.

43. A network as in claim 41 which includes N1 input switches.

44. A network as in claim 43 which includes N2 output switches coupled to the plurality.

45. A method of creating an interconnect apparatus having L inputs and N outputs comprising:

forming a first plurality of KxK substantially identical, static interconnect modules for coupling K^2 input signals to K^2 output ports wherein the signals can be one of an optical signal or an electrical signal; and

arranging selected members of the first plurality to form at least one LxN interconnect module wherein each LxN interconnect module includes $\left(\frac{L}{K}x\frac{N}{K}\right)$ modules from the first plurality.

46. A method as in claim 45 which includes forming a second plurality of LxN interconnect modules.

47. A method as in claim 46 wherein L=N.

48. A method as in claim 47 wherein selected members of the second plurality are arranged to form a third plurality of MxM interconnect modules wherein each MxM interconnect module includes $\left(\frac{M}{N}\right)^2$ modules from the second plurality.

49. A method as in claim 47 which includes selecting a member of the second plurality and coupling a set of input switches and output switches to the member thereby forming an NxN switch.

50. An interconnect network allocation method comprising:

selecting l inputs and N outputs;

defining a first modular KxK interconnect having K^2 signal carriers with K<L and K<N;

establishing a plurality of input signal carrier groups, $\frac{L}{K}$ and output signal groups $\frac{N}{K}$;

establishing a plurality of $\left(\frac{L}{K}x\frac{N}{K}\right)$ first modular interconnects to provide connectivity between L^2 input signals

and N^2 output signals thereby forming a second modular LxN interconnect network having (LxN) signal carriers.

51. A method as in claim 50 wherein L=N and forming a second plurality of NxN interconnect networks.

52. A method as in claim 50 where for N<M establishing a plurality of signal carrier groups $\frac{M}{N}$; establishing a plurality of $\left(\frac{M}{N}\right)^2$ NxN interconnect networks to provide connnectivity between M^2 input signals and M^2 output signals thereby forming a third, modular interconnect network having M^2 signal carriers.

53. A method as in claim 50 wherein the signal carriers comprise one of optical fibers or electrical conductors.

54. A method as in claim 50 which includes forming the first modular KxK interconnect with K^2 signal carrying inputs coupled to K^2 signal carrying outputs.

55. A method as in claim 54 which includes coupling connectors to the $2K^2$ signal carrying inputs and outputs.

56. A method as in claim 54 wherein inputs from a plurality of K-wide groups are coupled to corresponding outputs in respective K-wide groups in accordance with input group number.

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